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The Carolina Chemist

"The Spirit of the Department"

JANUARY, 1915

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THE CAROLINA CHEMIST

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JANUARY, 1915

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EDITORIALS

The Carolina alumnus has always been a loyal alumnus. And so we know the Carolina alumnus who is a chemist is loyal to the department which gave him his training and is interested in its welfare and progress. The young chemist-to-be now receiving his training in the department is interested in the doings of the alumnus and inspired by his success.

Feeling the need and usefulness of some medium of news exchange between the alumni and the department and its students, the Journal Club offers you the CAROLINA CHEMIST and begs that you feel it to be yours.

Therefore we expect you, alumnus, to lay aside your modesty long enough to tell us something of your work and your problems and to give the young chemist-to-be the benefit of your experience and advice.

So tell us about it. It's all in the family, you know.

"The spirit of the department!" We often hear it. What is it? You can not put your finger on it and you can not define it but it is there just the same, no doubt of that. Anyone who has been in the department knows it's there and knows it to be a very vital force. And people outside know it too. They cannot of course feel it but they see the evidences of it and comment on it.

What causes it? That's hard too but like lots of other things we are so sure of it and like it so much we don't worry about origins and causes even if we are scientists. We do know it

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originated long before our time and we know that the causes, whatever they are, are producing the good effects, so "we should worry."

How many of you chemists-to-be are catching it? A fellow either catches it or gets out. It's a thing you cannot escape if you stay around. Do you like to do your work even if you do grumble a bit about its being hard? Does Bruce have to run you out of the lab at six o'clock? Do you think the faculty and fellows about the best ever and would you rather be about the chemistry building than almost anywhere on the Hill? These are the symptoms. Have you caught "the spirit of the department?" It's great!

JOURNAL CLUB NOTES

The first recorded minutes of the Journal Club bear the date of January 25, 1901. The club has had an uninterrupted existence since that date. It is, therefore, now entering its fifteenth year. The following is the *Tar Heel's* account of the first meeting of the present year held September 28:

"The Chemical Journal Club held its "get-together" meeting Monday night. Thirty-six chemists and chemists-to-be, all properly labeled and guaranteed, assembled in the Chemistry work shop, properly transformed into a banquet hall, at nine o'clock.

"Dr. Herty presided over the rather informal meeting and gave a resume of the various improvements in the laboratory, the positions held by the men who left the department in June, the recent deaths in the field of chemistry, and the effects of the war situation on this laboratory.

"After this short discussion the meeting was turned over to Mr. Jeffries, the chef, who proceeded to serve the fatted calf, as it were. The menu consisted of coffee in beakers, with stirring rods instead of spoons, sandwiches in clock glasses, cheese in porous plates, apples in ice baths, crackers in evaporating dishes, all served with a delightful sauce of good fellowship. Several flashlights were made by way of finale."

Since that time five very interesting meetings have been held. The papers have been well presented, the discussion lively and the attendance good. The bi-weekly presentation and discussion

of current chemical literature are instructive and broadening in their influence. The survey of the literature is thorough and the presenting of an article as well as the understanding of the article necessary for presentation is valuable in the training of the chemist.

DEPARTMENTAL NEWS

The return of Dr. F. P. Venable to the staff of the department, after an absence of fourteen years as president of the University, has, of course, added great strength to the department. Dr. Venable is lecturing on general chemistry, thereby releasing Dr. Herty and giving him more time for his courses and the research men under him. Dr. Venable will in the spring give the course on the history of chemistry.

Chemistry 1 is now divided into two sections, one section being made up largely of pharmacy students and students preparing for the study of medicine.

This year, for the first time, a laboratory course for men who have had considerable laboratory work in high school is being given. This work consists in inorganic preparations and is in Dr. Venable's charge. These men are assigned to a separate laboratory and are doing excellent work. The work for the men who have had no previous laboratory experience is being strengthened as far as laboratory space and equipment permits.

Dr. Wheeler is offering this year a strong course in systematic organic analysis and also a course in the analysis of foods and food-stuffs.

Dr. Bell has introduced a thorough course in gas analysis.

Dr. Venable will be exchange professor to the University of South Carolina under the plan adopted this year between the Universities of North Carolina, South Carolina, Virginia and Georgia. It is expected that these lectures will be delivered in January.

THE DEPARTMENT IN THE NEWSPAPERS

The news of the election of Dr. Herty to the presidency of the American Chemical Society has been received by all his

friends with great pleasure. The honor is a great one and has been well bestowed indeed. This is the second time the honor has come to a University professor. Dr. Venable was president of the Society during 1905. Dr. Herty will deliver his presidential address at the Seattle meeting of the Society to be held August 31st to September 3rd.

The following news item and editorial appeared in the Charlotte *Observer* of January 3:

"Chapel Hill, Jan. 2.—The necessity for active and intelligent co-operation between scientific laboratories and Southern industries as a means to hastening the economic independence of the South, and the question of what is being done to meet this need is brought out in recent correspondence between Fairfax Harrison, president of the Southern Railway and Dr. Charles H. Herty, head of the chemistry department of the University of North Carolina. Doctor Herty is himself the inventor of a method for harvesting turpentine that has revolutionized that industry and saves millions of dollars yearly to the South.

President Harrison wrote to the University as follows:

" 'As the aim of the Southern Railway is not merely to serve the communities which it traverses, but also to hasten the economic independence of the South by all suitable means, it is anxious to ascertain to what extent the chemical branches of the Southern universities are endeavoring to render the by-products of the rapidly developing Southern mining interests commercially useful by extracting dyestuffs and manufacturing other chemicals therefrom; in other words, by bringing the universities in direct touch with the various phases of chemical activity, as was the case in Germany.

" 'The Southern Railway would, therefore, be grateful for any information which you may be so kind as to furnish in this regard, as it is greatly interested in the development of the universities along its lines and has been particularly interested in the university extension work which your institution has so wisely inaugurated.'

HERTY'S REPLY

"To which Doctor Herty replied:

" 'President Edward K. Graham of this university has handed me for reply your letter of December 16 in which you inquire to what extent have the chemical departments of our Southern universities brought themselves into "direct touch with the various phases of chemical activity, as was the case in Germany," referring especially to the extraction of dyestuffs, etc.

" 'I take particular pleasure in answering your letter, as I remember with every deep gratitude that when in 1901 I made my first effort along such a line as you have in mind, in connection with improvements in the naval stores industry, only two business men of the South were willing at the outset to give me a sympathetic hearing. Both of these were railroad men, former President Egan of the Central of Georgia and your own then vice-president, Mr. W. W. Finley.

NO CO-OPERATION YET

" 'Replying, therefore, to your specific question as to the co-operation in the extraction of dyestuffs—there has been no such co-operation. Not, however, because of lack of interest, but rather for the reason that this field, so thoroughly worked up from the scientific standpoint in both England and Germany, has in the South presented questions of industrial economics rather than of chemical research.

" 'Your broader question as to general co-operation between the laboratories and industries, finds, I think, a sympathetic answer here in this department, though there are still many defects in that co-operation which should exist if both parties to the co-operation are to profit to the greatest extent.

WORK OF GRADUATES

" 'The bulk of our work has been devoted naturally to the training of undergraduates. The men who have emphasized chemistry in their undergraduate work have gone into industries where they have proved their value in aiding in the chemical control of many of our Southern industries. This is notably the case in the iron and steel districts lying around Birmingham,

Alabama. The chief chemist at Ensley and many of the chemists in his laboratory, the superintendent of the Semet-Solvay by-products plant at Ensley, the superintendents of the Alys furnace at Birmingham and the Republic furnace at Thomas, Alabama, and many of the chemists in their laboratories are all graduates of the chemical department of this University.

"'A few of our graduates have been able to remain here and carry on research work. One of these is now the head research chemist for the American Tobacco Company; another is engaged in research on wood turpentine at Macon, Georgia; still another is now associate professor of chemistry at the North Carolina Agricutural and Mechanical College. Such illustrations could be multiplied; but the point which concerns you is the character of the research they were engaged in while they were being trained here. This has been two-fold in its character.

CHARACTER OF TRAINING

"'In part it has been in pure science, though it is difficult to make any real distinction between pure and applied science, for what seems to be of only theoretical interest at one time often becomes the most vital, practical matter later. Such research and its publication in pure science are duties every university owes to the increase and diffusion of knowledge.

"'Side by side with these researches in pure science, there have been completed and still are being carried on here numerous lines of investigation having a direct bearing on the industries, the material for many of these researches being furnished by interested corporations.

"'Doctors Venable and Bell are engaged in rare earth work, on material furnished by the Welsbach Company. North Carolina is richer in such rare earths than any other Southern State.

ARTIFICIAL INDIGO

"'Doctor Wheeler has been working on anthranalic acid, one of the intermediate products in the artificial preparation of indigo.

"'In my own work in co-operation with two of our students, a simple and rapid but accurate method has been worked out for use by our cottonseed oil mills, enabling any of these at a very slight cost to maintain complete chemical control of their opera-

tions. Many of the mills sent representatives to this laboratory a few summers ago for full instruction in the method, which the University offered to every mill in the South.

"'We are now trying to determine the character of the changes involved in the cooking of fossil resins in varnish making. This great industry is based upon this procedure. At present it is carried out on a purely empirical basis. Real progress in this industry must be based upon a more scientific basis than now exists. This work is being carried on in co-operation with a large varnish firm of New York City, which supplies us with the raw material and the product cooked by its experienced men in the factory.

RESEARCH IN OLEORESINS

"'A number of researches have been completed or are in progress in the field of oleoresins. In this work we have been aided in two ways:

"'First, in having authentic, fresh specimens furnished us direct from the woods by the turpentine operators.

"'Second, by a scholarship supported during the past five years by a large soap company. This scholarship has paid practically all the living expenses of one of our senior students each year, he in turn devoting his research to this field so important to soap makers.

"'Such types of research as above mentioned constitute only a beginning of the co-operation which I hope will exist between this laboratory and our Southern industries.

"'Real and effective co-operation does not yet exist, as it has existed for years in Germany, for several reasons among which may be mentioned:

SOUTHERN ATTITUDE

"'First, In strong contrast to German custom, Southern business men have looked askance at possible help from universities in the development of their industries.

"'Second, Southern capital has preferred safe, well understood lines of investment during this early period of the South's industrial awakening. I could tell you a good and true story in this connection, but I am already writing at too great length.

"'Third, We have not been able to furnish a sufficient number

of properly trained young men. This has been due to the urgent demand for our young men who have taken the bachelor's degree to go into teaching and into the control of laboratories of industrial plants. For graduate training which the future demands, three things are necessary:

WHAT IS NEEDED

" 'A first-class chemical library. This we now have here.

" 'Special equipment other than that required for routine undergraduate class work. This we are gradually acquiring.

" 'Young men who are willing to postpone their entrance into the commercial world until they have had higher training in methods of research. We are building up slowly in this respect; slowly for the reason that the serious and earnest minded young man who has the desire and spirit to continue such higher training usually is not financially able to do so. He has either already worked his way through his undergraduate course and the prospect of a fairly decent and immediate saalry looks good to him and off he goes, regardless of the ultimate future; or, he has borrowed money for his college course and wishes to relieve this load of debt as promptly as possible—so off he goes. This is a real difficulty, but one which may gradually correct itself as the wealth of the South increases. Nevertheless it is a stumbling block now that those of our boys who are able financially do not seem to care for this higher training, while those who do desire it and are well qualified in every other way to receive it, are prevented by very limited finances from training themselves to become real leaders in that higher industrial development of the South which we all long for and confidently expect some day.' "

Under the caption "An Alert University," the *Charlotte Observer* prints the following editorial:

"Through correspondence between President Fairfax Harrison of the Southern Railway and President Edward K. Graham of the North Carolina University, some information of an interesting character is brought out in regard to the endeavors of the University in the direction of cooperation in chemical research work with Southern industries. It appears from

a statement by Professor Charles H. Herty, head of the University's chemistry department, that the students are engaged in some important laboratory experiments through which the industrial interests of the State may eventually greatly profit. Doctor Venable may make certain earths of commercial value to the Welsbach people. Doctor Wheeler may succeed in producing an artificial indigo by his experiments with anthranalic acid, and Professor Herty may bring about a revolution in chemical control operations in cotton seed oil mills. The vast advantage already given the turpentine industry through Professor Herty's researches and experiments, may be followed by an improvement in the system of varnish making. We should judge by the showing made that the University of North Carolina is more nearly abreast of the times in chemical laboratory work than is the average of Southern universities. At any rate, the fact is again in evidence that the University of North Carolina is under a wide-awake and progressive administration."

RESEARCH IN THE DEPARTMENT

One of the factors which contributes very largely to the growth of any department is the spirit of original investigation. The standing of the department among chemists and its success in training chemists is largely determined by the research carried on by its members. Ever since Dr. Venable came to the University more than thirty years ago, there has been going on at Carolina some kind of chemical investigation. In consequence the department is well known in the chemical world and holds a high place. This spirit of research is a part of "the spirit of the department."

This spirit of research is always growing and this year as usual it seems greater than ever. Many interesting problems are being studied. Dr. Herty has under his direction the work of C. B. Carter, V. A. Coulter, W. L. Jeffries, and D. H. Killeffer. Carter is studying the compounds formed by the union of arsenic tri-iodide with ammonia. The problem is proving a knotty one. Coulter is making progress on the study of resene, the so-called unsaponifiable matter in rosin. A study of the changes taking place in the cooking of fossil resins for varnish

manufacture is occupying the attention of Jeffries. Killeffer is studying the acids occuring in ordinary rosin. Dr. Bell is directing W. A. Rudisill and W. N. Pritchard, Jr., in a study of certain inorganic salts from the point of view of the phase rule. Dr. Wheeler and V. C. Edwards are making a study of certain derivatives of naphthazarin. Dr. Venable and Dr. Bell are making a redetermination of the atomic weight of zirconium.

THE LIBRARY

A part of the department which has proved of so great value and of which we are very proud is our departmental library. When the library is analyzed, modesty is dissolved and a heavy precipitate of boasting appears. Confirmatory evidence is not difficult to produce. It is not uncommon to hear such claims as these, "no college library excels ours in journalistic literature" and "the best chemical library in the South." We will not debate the question here. We know we have a superb collection of journals which are much used. In fact one of the first things a chemist-to-be is taught is the use of the library.

There are between forty-five and fifty chemical periodicals in the library. Most of the journal sets are complete and one set runs back complete to 1789. These facts give some indication of our equipment along this line but still the librarian longs for more and promises an article on the library, its equipment and its needs.

ALUMNI NOTES

As usual the men who left us last year found little difficulty in getting pleasantly located. J. T. Dobbins, who received his Ph. D., and H. L. Cox, who received the B. S. in chemical engineering, are teaching in the State Agriculture and Mechanical College at Raleigh. A. J. Flume, B. S., is teaching analytical chemistry in the South Carolina Medical College at Charleston. J. A. Struthers, B. S., is doing analytical work for the Union Seed and Fertilizer Co., of Atlanta. L. B. (Helium) Rhodes, A. M., is in the food laboratories at Raleigh.

R. B. Hall, 1911, is chemist for the British-American Tobacco Co., at Petersburg, Va.

W. H. Strowd, 1909, is at Madison, Wis., in charge of the feed and fertilizer control for the state.

B. H. Knight, A. B., 1911, A. M., 1913, is with the Edison Co., at East Orange, New Jersey.

F. R. Weaver, ex-1912, is in charge of the blast furnace laboratory of the Inland Steel Co., at Indiana Harbor, Ind.

Duncan McRae, 1909, is an instructor at Mass. Institute of Technology.

C. S. Venable, A. B., 1910, A. M., 1911, is an assistant and working for his Ph. D. at Mass. Tech.

RECENT PROGRESS IN CHEMISTRY

Hydrogen occurs in the heavenly plants.

Hydrogen occurs in the spectroscope.

Water acts upon chlorine giving off water and forming slaked lime.

Water acts upon chlorine giving off ozone.

The symbol of an element represents its anatomic weight.

The air consists of oxygen, hydrogen, carbon dioxide, helium, neon, krypton and other micro-organisms.

To neutralize an acid with a base, take anions of the acid and the cations of the base, add an indicator, constantly stirring, then add a few drops of an acid until the substance changes color.